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## Racial/Ethnic Discrimination and Mental Health in Mexican-Origin Youths and their Parents: Testing the “Linked Lives” Hypothesis

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### Abstract

**Purpose**—Using a life course perspective, the present study tested the concept of “linked lives” applied to the problem of not only how racial/ethnic discrimination may be associated with poor mental health for the target of discrimination but also how discrimination may exacerbate the discrimination—distress link for others in the target’s social network—in this case, the family.

**Methods**—The discrimination—distress link was investigated among 269 Mexican-origin adolescents and their parents both cross-sectionally and longitudinally. It was hypothesized that parents’ discrimination experiences would adversely affect their adolescent children’s mental health via a moderating effect on the target adolescent discrimination—distress link. The converse was also hypothesized for the target parents. Multilevel moderation analyses were conducted to test the moderating effect of parents’ discrimination experiences on the youth discrimination—

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#### Contributors Statement:

All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

Irene J.K. Park, PhD, conceived and executed the study and wrote the manuscript.

Han Du, MA, conducted the statistical analyses and aided in the writing of the Data Analytic Strategy and Results sections.

Lijuan Wang, PhD aided in the design and supervision of the statistical analyses and in editing the manuscript.

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distress link. We also tested the moderating effect of youths' discrimination experiences on the parent discrimination—distress link.

**Results**—Parents' discrimination experiences significantly moderated the longitudinal association between youths' discrimination stress appraisals and mental health, such that the *father's* discrimination experiences *exacerbated* the youth discrimination—depression link. Youths' discrimination stress appraisals were not a significant moderator of the cross-sectional parent discrimination—mental health association.

**Conclusions**—Implications of these findings are discussed from a linked lives perspective, highlighting how fathers' discrimination experiences can adversely affect youths who are coping with discrimination, in terms of their mental health.

## Keywords

racial/ethnic discrimination; Mexican-origin adolescents and parents; linked lives; life course; mental health; depression; anxiety

Although the public health implications of racial/ethnic discrimination have often been investigated in terms of its adverse mental health effects on the target individual[1], much less research has focused on the damage wrought by racial/ethnic discrimination across a social network, such as the family system. According to a life course perspective and particularly the notion of “linked lives,”[2] human lives are interdependent, and the events that impact one individual will have consequences for others in their social environment. In the present study, we apply a life course perspective and specifically the concept of “linked lives” on how racism and discrimination are related to mental health inequities, as theorized by Gee and colleagues[3]. Emerging studies have demonstrated these kinds of “ripple effects” by showing how racial/ethnic minority parents' experiences of discrimination are linked to poor mental health and socioemotional outcomes in their children[4–7] (see also evidence of “vicarious discrimination”[8]). For example, parents' discrimination experiences have been associated with worse parental mental health[4,6,7] or harsh parenting practices[6] and parent-child hostility[7], that are then associated with poor child adjustment. However, none of these prior studies have applied this theoretical perspective to the problem of discrimination in Latino youths and their families. Given the unique cultural context (e.g., acculturation processes and cultural norms) that shape relational dynamics within Latino (specifically Mexican-origin) families[9,10], an empirical test of the linked lives hypothesis in this population is important.

Currently, 17.9 million Latino youths under the age of 18 comprise the largest minority group of youths in the U.S.,[11] and they experience striking mental health disparities[12,13]. Racial/ethnic discrimination and its perceived stressfulness[14,15] are significant contributing factors associated with poor mental health[1]. Prior research has estimated that approximately 50% of Latino young adults (ages 18–24 years) report experiencing discrimination [16] and 70% of Latino adults (ages 18–74) in the U.S. have experienced or witnessed discrimination during their lifetime [17]. Before advances can be made to reduce the adverse effects of discrimination on youths' mental health, it is important to obtain a more holistic understanding of how parents' discrimination experiences can

affect their adolescent children (and vice versa). By doing so, practitioners can identify the proper target for prevention/intervention purposes, and researchers and policy makers can determine the appropriate unit of analysis for future investigation. For example, among minority youths, how do the discrimination experiences of other family members (e.g., parents) affect the target youth? Although prior research has begun to address these types of questions[4–7,18], the focus has been on mediating mechanisms linking parent discrimination to child mental health; none have taken a moderation approach, in examining interactive effects of discrimination experienced by the target and both parents on the discrimination—mental health link for multiple family members. The current study makes a contribution by testing moderating effects on the discrimination—mental health link in not only the target adolescent but also in mothers and fathers, using a longitudinal design. Moreover, given the call for prioritizing the assessment of the stressfulness of discriminatory experiences in future research[19], the present investigation measured adolescents' discrimination stress appraisals and the frequency of parents' everyday discrimination experiences. Thus, the current study addresses these critical but underresearched issues for the first time among Mexican-origin families. The focus on Mexican-origin youths and families is important given that Mexicans comprise the largest proportion (63.4%) of Latinos in the U.S.[20]

## Theoretical Framework: Life Course Perspective

The life course perspective calls for the study of human lives within the context of time, age, and social patterns that affect individual trajectories[2]. One key principle within the life course approach is that of linked lives, which assumes that “lives are lived interdependently, and social and historical influences are expressed through this network of shared relationships” [2, p. 4]. Applied to the problem of health inequities and research on racism and racial/ethnic discrimination, the concept of linked lives implies that when one person encounters racial/ethnic discrimination, that experience has ripple effects across their social network, such as their family. As a result, discrimination may operate to either weaken or strengthen social ties and social capital[3].

The linked lives principle, as well as the limited empirical research in this area, guided the conceptualization of the present study and the generation of the study hypotheses. Specifically, when Mexican-origin adolescents encounter racial/ethnic discrimination, the linked lives principle would suggest that their discrimination experience would affect not only the target adolescent but also their parents. Conversely, when a Mexican-origin mother or father encounters discrimination, the same principle would suggest that their discrimination experience would affect not only the parent, but also others in their family context, such as their adolescent child. For the purpose of the present study, the linked lives concept was tested through interaction effects in multilevel moderation models. We predicted that parents' (mother's and father's, respectively) discrimination experiences would exacerbate the link between youths' discrimination stress appraisals and their mental health. Conversely, we predicted that the youth's discrimination stress appraisals would exacerbate the parent's discrimination—parent mental health link. These predictions were based on prior empirical research showing that parents' experiences of discrimination were prospectively associated with distress and negative affect for their child and vice versa[18].

Mental health outcomes were anxiety and depression. These hypotheses were tested both cross-sectionally and longitudinally using a multilevel modeling approach. Age, gender, nativity status, and family income were statistically controlled for in all analyses given prior research indicating variations by age, gender, nativity status, or socioeconomic status in reporting discrimination[16,19,21,22] as well as age and gender differences in anxiety[23] and depression[24].

## METHODS

The data for the current study originate from a 3-wave longitudinal study that examined mediating mechanisms and moderators associated with the link between discrimination and mental health in Mexican-origin adolescents and their families; sample descriptives are provided in these prior papers[25,26] and in Table 2.

### Participants

The Time 1 (T1) data analytic sample of youths comprised  $n = 269$  Mexican-origin adolescents, 12–17 years old ( $M_{\text{age}} = 14.1$  years,  $SD = 1.6$ ). At Time 2 (T2) and Time 3 (T3), the data analytic sample was  $n = 246$  Mexican-origin adolescents. As previously reported[25,26], the adolescent sample was 57% female ( $n = 153$ ), with 71% US-born ( $n = 191$ ) and 29% Mexican-born ( $n = 78$ ). The T1 data analytic sample of parents comprised  $n = 267$  mothers and  $n = 236$  fathers.

### Recruitment and Procedures

Adolescents and their parents were recruited from community-based organizations, churches, and public schools in the Midwestern U.S. We used recommended recruitment and retention practices for Latino immigrant families[27] and an ethnic-homogeneous design[28], focusing on families of Mexican descent. Inclusion criteria were: 1) the family has an adolescent, age 12–17 years old, of Mexican origin; 2) residing with his/her biological mother, of Mexican origin; 3) the adolescent's biological father was also of Mexican origin. Exclusion criteria were: 1) the adolescent has a severe learning or developmental disability preventing them from understanding or responding to survey questions; and, 2) the family participated in the pilot study (2011–2012) which examined similar constructs.

Data were collected from adolescents at three time points, spaced approximately 4 months apart (baseline, 4 months, and 8 months) from December 2013 through June 2015 over an 18-month period. Youths were required to have written parental permission and then also give their written informed assent prior to survey completion at T1. The target adolescent was asked to independently complete a questionnaire in their preferred language (English or Spanish). At T1, 97.8% (263 out of 269 youths) completed the survey in English using an audio computer-assisted self-interview (ACASI) approach; 2.2% (6 youths) completed the survey in Spanish via face-to-face interview with a bilingual interviewer or Spanish language written questionnaire.

At T1, eligible parents included  $N = 267$  mothers and  $N = 236$  fathers. Parents provided written consent for their own participation prior to survey completion at T1. Mothers were

surveyed primarily via face-to-face interviews conducted by bilingual, bicultural research team members. At T3, 91.4% of mothers ( $n = 244$  out of 267) provided their reports about their child's mental health through a brief interview. Given the notoriously low rate of father participation in research studies[27], fathers were offered three options for completing the survey: a) in-person interview ( $n = 181$ ); b) phone interview ( $n = 6$ ); or c) mailed paper survey ( $n = 49$ ), mailed back in self-addressed, stamped envelopes or returned by another family member (youth or mother). It appears the paper survey option boosted our father sample. Results from a one-way ANOVA indicated that there was no significant effect of fathers' survey administration method on fathers' discrimination [ $F(2, 233) = 0.55, p = .58$ ], fathers' anxiety [ $F(2, 233) = 0.30, p = .74$ ], or fathers' depression [ $F(2, 232) = 2.51, p = .08$ ]. Among 269 eligible participating youths at T1, 87.7% of their fathers ( $n = 236$ ) completed the survey at T1.

Participating families were compensated up to \$190 for their participation in the study. The study procedures were approved by the university's Human Subjects Institutional Review Board, and the identity of participants was protected by a Certificate of Confidentiality (CC-MH-13-127) issued by the National Institute of Mental Health.

## Measures

All measures were available in both English and Spanish for adolescents and their parents. Demographic information used as control variables included: adolescents' age, gender, and nativity status; parents' age and nativity status; and, annual family income (assessed via mother's report of father's annual income). The main study measures are summarized in Table 1.

## Data Analytic Strategy

Multilevel moderation analyses were conducted to test the moderating effect of parents' discrimination experiences at T1 on the longitudinal youth discrimination—distress link (time points nested within target adolescents) and the moderating effect of youths' discrimination experiences at T1 on the T1 parent discrimination—distress link cross-sectionally (parents nested within families) due to the nested nature of the data.

For longitudinal multilevel moderation analyses, time is included as a Level-1 covariate for detrending because we are interested in testing the relations between two time-varying variables (e.g., youths' discrimination experiences and youths' mental health) net the time effect; this is useful for statistically controlling for testing (habituation) effects due to repeated administration of the study measures [29]. A *within-person effect* indicates how two time-varying variables are related within an individual over time (e.g., degree to which an adolescent experiences worse mental health when he or she perceives more discrimination than when he or she does not). A *between-person effect* indicates how two time-varying variables covary across individuals (e.g., degree to which adolescents who experience more discrimination differ in mental health problems than those who experience less discrimination). A *cross-level effect* indicates how the within-person relation between two time-varying variables varies by different levels of time-invariant variables. The focus of the present study is a cross-level effect, representing the degree to which an adolescent with

parents who experience more discrimination has a stronger within-adolescent relation between youths' discrimination and mental health. We adopted a one-step multilevel approach[29], in which person-mean centering is applied to disaggregate between-person and within-person effects. Specifically, the person mean of youths' discrimination for adolescent  $i$  ( $mDSA_i$ ; obtained by averaging the scores over time for adolescent  $i$ ) and the person-mean centered youths' discrimination for adolescent  $i$  ( $cDSA_{it} = DSA_{it} - mDSA_i$ ) are included for the disaggregation. Note that the correlation between  $mDSA$  and  $cDSA$  is 0. Using depression as an example for the outcome variable, the multilevel moderation model is described below:

$$\text{Level 1: } Dep_{it} = \gamma_{0i} + \gamma_{1i} * cDSA_{it} + \gamma_{2i} * time_{it} + e_{it}$$

$$\text{Level 2: } \gamma_{0i} = \gamma_{00} + \gamma_{01} * mDSA_i + \gamma_{02} * EDS\_M_i + \gamma_{03} * EDS\_F_i + \gamma_{04} * AGE_i + \gamma_{05} * GENDER_i + \gamma_{06} * NATIVITY_i + \gamma_{07} * SES_i + u_{0i}$$

$$\gamma_{1i} = \gamma_{10} + \gamma_{11} * EDS\_M_i + \gamma_{12} * EDS\_F_i + \gamma_{13} * AGE_i + \gamma_{14} * GENDER_i + \gamma_{15} * NATIVITY_i + \gamma_{16} * SES_i + u_{1i}$$

$$\gamma_{2i} = \gamma_{20} + \gamma_{21} * EDS\_M_i + \gamma_{22} * EDS\_F_i + \gamma_{23} * AGE_i + \gamma_{24} * GENDER_i + \gamma_{25} * NATIVITY_i + \gamma_{26} * SES_i + u_{2i}$$

where  $time_{it}$  is the measurement occasion at time  $t$  for adolescent  $i$ , and  $cDSA_{it}$  (Youth Discrimination Stress Appraisals, predictor variable) and  $Dep_{it}$  (Youth Depression, outcome variable) are the person-mean centered and observed scores for adolescent  $i$  at time  $j$ , respectively.  $EDS\_M_i$  and  $EDS\_F_i$  indicate discrimination at T1 for adolescent  $i$ 's mother and father respectively (i.e., moderators) using the Everyday Discrimination Scale (EDS).  $AGE_i$ ,  $GENDER_i$ ,  $NATIVITY_i$  (nativity status), and  $SES_i$  (socioeconomic status assessed via mother's report of father's annual income) are the control variables for adolescent  $i$ .  $\gamma_{10}$  measures the average within-adolescent relation between youths' discrimination and depression after controlling for the covariates.  $\gamma_{11}$  and  $\gamma_{12}$  are cross-level moderation effects (the main parameters of interest), quantifying the moderating effects of mothers' and fathers' discrimination experiences on the within-adolescent links between youths' discrimination stress appraisals and youths' depression, net the time effect.

For the cross-sectional multilevel moderation analyses, a variable *family role* (denoted as  $ROLE_{ri}$ ) is created for family member  $r$  in family  $i$  to distinguish father and mother within a family. Using depression as an example for the outcome variable, the multilevel model is described below:

$$\text{Level 1: } PHQ_{ri} = \gamma_{0i} + \gamma_{1i} * ROLE_{ri} + \gamma_{2i} * EDS_{ri} + \gamma_{3i} * EDS_{ri} * ROLE_{ri} + \gamma_{4i} * AGE_{ri} + \gamma_{5i} * AGE_{ri} * ROLE_{ri} + \gamma_{6i} * NATIVITY_{ri} + \gamma_{7i} * NATIVITY_{ri} * ROLE_{ri} + e_{ri}$$

$$\text{Level 2: } \gamma_{0i} = \gamma_{00} + \gamma_{01} * DSA_i + \gamma_{02} * SES_i + u_{0i}$$

$$\gamma_{1i} = \gamma_{10} + \gamma_{11} * DSA_i + \gamma_{12} * SES_i$$

$$\gamma_{2i} = \gamma_{20} + \gamma_{21} * DSA_i + \gamma_{22} * SES_i$$

$$\gamma_{3i} = \gamma_{30} + \gamma_{31} * DSA_i + \gamma_{32} * SES_i$$

$$\gamma_{4i} = \gamma_{40} + \gamma_{41} * DSA_i + \gamma_{42} * SES_i$$

$$\gamma_{5i} = \gamma_{50} + \gamma_{51} * DSA_i + \gamma_{52} * SES_i$$

$$\gamma_{6i} = \gamma_{60} + \gamma_{61} * DSA_i + \gamma_{62} * SES_i$$

$$\gamma_{7i} = \gamma_{70} + \gamma_{71} * DSA_i + \gamma_{72} * SES_i$$



where  $PHQ_{ri}$  (depression scores for parents, outcome variable),  $EDS_{ri}$  (discrimination scores for parents, predictor variable),  $AGE_{ri}$  (control variable), and  $NATIVITY_{ri}$  (control variable) are the observed scores for parent  $r$  in family  $i$  measured at T1.  $SES_i$  is a control variable for family  $i$ .  $DSA_i$  represents an adolescent's discrimination stress appraisals in family  $i$  at Time 1. When  $ROLE_{ri}$  is coded as 0 for father and 1 for mother,  $\gamma_{20}$  measures the strength of fathers' discrimination-depression link after controlling for the covariates, and  $\gamma_{21}$  measures whether youths' experiences of discrimination moderate fathers' discrimination-depression link (cross-level moderation effect). On the other hand, when  $ROLE_{ri}$  is coded as 1 for father and 0 for mother,  $\gamma_{20}$  and  $\gamma_{21}$  indicate the corresponding coefficients for mothers.

The multilevel analysis was conducted using SAS PROC MIXED. Missing data were handled by maximum likelihood estimation with the missing at random missingness assumption.

## RESULTS

All means, standard deviations, and correlations between study variables are shown in Table 2. Youths' discrimination stress appraisals at T1 were significantly associated ( $p < .001$ ) with youths' anxiety and depression, respectively at T1 (cross-sectionally) as well as at T2 and T3 (longitudinally). Mothers' discrimination experiences at T1 were significantly associated with their own depression and anxiety, respectively, at T1; likewise, fathers' discrimination experiences were significantly associated with their own depression and anxiety, respectively ( $p < .001$ ), cross-sectionally. However, correlations between youths' discrimination stress appraisals and parents' mental health were non-significant, as were correlations between parents' discrimination experiences and youths' mental health.

Results from the multilevel moderation analyses, however, indicated that fathers' discrimination experiences significantly moderated—and, as hypothesized, *exacerbated*—the within-adolescent link between youths' discrimination stress appraisals and youths' depressive symptoms [see Table 3;  $\gamma_{12}$  (fathers) = 0.66,  $p = .022$ ], but not youths' anxiety. Mothers' discrimination experiences did not significantly moderate the link between youths' discrimination stress appraisals and youths' anxiety or depressive symptoms (Table 3,  $\gamma_{11}$ ).

Youths' discrimination stress appraisals at T1 did not significantly moderate the T1 link between parents' (neither for mothers nor for fathers) discrimination experiences and parents' mental health (Table 3,  $\gamma_{21}^F$  and  $\gamma_{21}^M$ ). The link between mothers' discrimination experiences and mothers' anxiety and depression, respectively, was significant (Table 3,  $\gamma_{20}^M$ ), even after controlling for covariates (i.e., age, nativity status, and SES); however, the discrimination—distress link was non-significant for fathers (Table 3,  $\gamma_{20}^F$ ). For an expanded description of results with all model parameters, please see the on-line supplemental files, Tables A and B.

## DISCUSSION

The purpose of the present study was to test whether and how family members' experiences of racial/ethnic discrimination adversely affect the target individual's discrimination

experiences vis-à-vis his/her mental health. Theoretically, the study was guided by the notion of “linked lives” (drawn from a life course perspective) as applied to the problem of racism and interpersonal discrimination. Moreover, we conceptualized racial/ethnic discrimination as a psychosocial stressor and assessed discrimination in multiple ways. These theoretical and methodological features enabled us to draw careful inferences about how these aspects of discrimination experiences are associated with mental health in Mexican-origin families, as described below.

Results from multilevel moderation analyses indicated that fathers’ everyday discrimination experiences significantly *exacerbated* the association between adolescents’ discrimination stress appraisals and adolescent depression. However, the moderating effect of fathers’ discrimination experiences was non-significant when the outcome was youths’ anxiety. These results suggest that fathers matter—particularly in how a father’s discrimination experiences affect his adolescent child’s risk for depression. Given that fathers are often seen as the authority figure and economic provider in Latino families[10], a father’s mistreatment due to his race/ethnicity can negatively impact an adolescent child’s view of their future, their world, and themselves, the three components of the “cognitive triad” theorized by Beck’s cognitive model of depression[30]. Emerging research also provides convergent evidence that victimization experiences can lead to depression, especially when children receive negative information from multiple sources, including their parents[31,32]. Beck’s cognitive theory of depression also may explain why fathers’ discrimination experiences are specific to generating youths’ negative cognitive schemas related to depressive symptoms but not anxiety. Given that the measure tapping youths’ discrimination experiences was one examining stress appraisals, which may capture the notion of vigilance and anticipatory stress[15], it may be that these discrimination stress appraisals act as perseverative cognitions[14] compounding the negative cognitive triad leading to depression. Further research is needed not only to examine how fathers’ discrimination experiences (and other vicarious or direct involvement by fathers) may impact their adolescent children’s mental health, for better or for worse, but also to test how discrimination, vigilance, anticipatory stress, and perseverative cognitions interact to increase the risk for depression and other adolescent mental health problems.

Mothers’ discrimination experiences were not a significant moderator of the adolescent discrimination—adolescent mental health link. One possible reason for this null finding may be linked to mothers’ traditional gender roles, which situate mothers primarily in the domestic sphere; thus, mothers’ exposure to, and severity of, discrimination experiences may be more limited compared to those of fathers. More research is needed to parse apart the differential influences and dynamics operating in mother-adolescent vs. father-adolescent dyads with respect to direct and vicarious experiences of discrimination.

Results also indicated that adolescents’ discrimination stress appraisals were not a significant moderator of the parent discrimination—parent mental health link, for both mothers and fathers, regardless of mental health outcome (anxiety or depression). Several factors may play a role in this null finding. First, because the parent discrimination—parent mental health association was measured cross-sectionally, caution must be taken in interpreting this result. It also may be that adolescents are still at a developmental stage



where they are more impacted by their parents than vice versa. Parents may not be aware of their adolescent child's discrimination experiences, especially if there are communication barriers due to language, culture, or simply mismatching schedules that prevent consistent interactions between family members. Future studies should identify the settings and conditions in which youths' experiences of discrimination do impact the parent discrimination—mental health link.

The present study makes several contributions to the current literature on discrimination and mental health and overcomes some limitations of prior studies. First, unlike prior research on discrimination and mental health outcomes which tends to be largely cross-sectional, the present study employed a longitudinal design across three waves. Second, in addition to assessing the discrimination experiences and mental health outcomes of the target youth, the present study also investigated these variables among both mothers and fathers (the latter often being neglected or ignored in research settings due to recruitment challenges[27]); prior research has often only included the target youth and/or the primary caregiver. Third, in the present study, we tested for *moderating* effects of parents' (mothers' and fathers') discrimination experiences on the discrimination—mental health link among youths, as well as the moderating effect of the youth's discrimination experiences on the parent discrimination—mental health link, in contrast to prior research which has fruitfully tested for *mediating* processes between discrimination and mental health. This approach has translational clinical implications in revealing the most appropriate targets for intervention and prevention (e.g., the critical importance of including fathers in such efforts). Finally, this conceptual and analytical approach of examining the target adolescent's familial network was guided by the life course perspective and the notion of linked lives, which represents a novel theoretical application to the investigation of racial/ethnic discrimination and its effects on mental health in a sample of Mexican-origin youths and their families.

### Limitations and Directions for Future Research

Despite the present study's strengths and contribution to the emerging literature on how parents' discrimination experiences may impact their children, there are some limitations that should be acknowledged. First, given the study's ethnic-homogeneous design, only one ethnic group was investigated, namely Mexican-origin families; future research should test the linked lives hypothesis in other racial/ethnic minority populations. Second, the racial/ethnic discrimination measures did not assess for multiple forms of discrimination nor did they necessarily examine frequency (for youths) or severity/stressfulness (for parents), though we did examine stressfulness of discrimination experiences for youths and frequency of everyday discrimination experiences for parents. Heeding the calls in the literature to assess discrimination across multiple dimensions, domains, and contexts[19] will allow for more precise prediction of its adverse mental health effects across family systems or other social networks. Third, although the present study broke new ground in testing family members' influences as moderators of the discrimination—mental health link, future studies should continue to explore how family members' discrimination experiences might serve to *mediate* the discrimination—mental health link through various pathways, such as parents' racial/ethnic socialization practices [33], harsh parenting practices and parents' poor mental health as indicated by emerging research[4,6,7], or via social capital and social support as

proposed by Gee and colleagues[3]. Further, we recommend that future research tease apart whether or not the same (or different) mechanisms are operating when parents' discrimination experiences moderate the adolescent discrimination—adolescent mental health linkage vs. when adolescents' discrimination experiences moderate the parent discrimination—parent mental health linkage; this is an open empirical question that was beyond the scope of the current study but worthy of future investigation. Finally, the study's sample size may have limited our ability to detect significant interaction effects; a larger sample size may have yielded a higher number of significant moderating effects. Relatedly, another potential avenue for future research is to test whether or not the moderating effects found in the present study are more (or less) potent in geographic areas with a significantly higher density of Mexican-origin families (e.g., ethnic enclaves).

Taken together, the study findings provide evidence partially supporting the linked lives hypothesis, in that fathers' discrimination experiences exacerbated the association between youths' discrimination appraisals and youths' depression. At the same time, the support for the linked lives hypothesis was qualified due to the non-significant effects of youths' discrimination appraisals on the link between parents' everyday discrimination experiences and parents' mental health outcomes. These novel data will not only help inform clinicians regarding the proper target for intervention and prevention purposes when treating Mexican-origin youths and their families but also can help produce a paradigm shift in the behavioral sciences regarding the appropriate unit of analysis for future public health research in the area of racial/ethnic discrimination and adolescent health disparities in racial/ethnic minority populations.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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## Abbreviations

<b>DSA</b>	discrimination stress appraisals
<b>EDS</b>	Everyday Discrimination Scale
<b>PHQ</b>	Patient Health Questionnaire
<b>SES</b>	socioeconomic status
<b>T1</b>	Time 1
<b>T2</b>	Time 2

## T3 Time 3

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### Implications and Contribution

Although the discrimination—distress link is well-documented in the health disparities literature, little is known about how parents' discrimination experiences affect adolescent adjustment. This study shows that fathers' discrimination experiences *exacerbate* the discrimination—depression link in their adolescent children. Accounting for “linked lives” is important in addressing mental health disparities.

Table 1

## Summary of main study measures

Measure	Time	Report	Number of Items	Sample item	Response options/coding <sup>a</sup>	Cronbach's alpha
<u>Adolescent Measures</u>						
Discrimination Stress Appraisals [34,35]	1–3	Youth	6	"I have felt that others do not accept me because of my ethnic background"	1 ( <i>Not at all stressful</i> ) to 4 ( <i>Very stressful</i> ); 0 = <i>Does not apply</i> ; mean scores (range = 0 – 3.67).	T1 = .69; T2 = .73; T3 = .73
Anxiety: MASC-10 [36]	1–3	Youth	10	"I feel restless and on edge"	0 ( <i>Never true about me</i> ) to 3 ( <i>Often true about me</i> ), how feeling recently.	T1 = .67; T2 = .70; T3 = .72
Depression: CDI-2, Short Form [37]	1–3	Youth	12	"I am sad once in a while; I am sad many times; I am sad all the time"	Response options reflected the severity of a given symptom on a 3-point scale, ranging from 0 ( <i>none</i> ) to 2 ( <i>definite</i> ), past 2 weeks	T1 = .81; T2 = .76; T3 = .81
<u>Parent Measures</u>						
Perceived Discrimination: EDS [38]	1	Mothers Fathers	10	"You are called names or insulted."	1 ( <i>almost everyday</i> ) to 6 ( <i>never</i> ); reverse-coded	mothers: .86 fathers: .90
Anxiety: GAD-7 [39]	1	Mothers Fathers	7	"Feeling nervous, anxious, or on edge"	0 ( <i>not at all</i> ) to 3 ( <i>nearly every day</i> ); over last 2 weeks	mothers: .87 fathers: .85
Depression: PHQ-9 [40]	1	Mothers Fathers	9	"Feeling down, depressed, or hopeless"	0 ( <i>not at all</i> ) to 3 ( <i>nearly every day</i> ); over last 2 weeks	mothers: .84 fathers: .82

MASC = Multidimensional Anxiety Scale for Children; CDI = Children's Depression Inventory; EDS = Everyday Discrimination Scale; GAD = Generalized Anxiety Disorder; PHQ = Patient Health Questionnaire.

<sup>a</sup>Sum scores were used, unless otherwise indicated



Table 2

Bivariate correlations between study variables, means, and standard deviations

Variables <sup>a</sup>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. DSA1	--														
2. DSA2	.61***	--													
3. DSA3	.51***	.63***	--												
4. Anx1	.33***	.25***	.24***	--											
5. Anx2	.25***	.28***	.20**	.66***	--										
6. Anx3	.26***	.29***	.28***	.65***	.74***	--									
7. Dep1	.24***	.20***	.10	.45***	.33***	.36***	--								
8. Dep2	.25***	.40***	.25***	.31***	.39***	.44***	.57***	--							
9. Dep3	.29***	.35***	.35***	.31***	.36***	.51***	.48***	.69***	--						
10. EDS-M	0.05	0.03	0.04	0.02	0.02	0.07	0.03	0.00	0.12	--					
11. EDS-F	0.00	0.05	0.03	0.01	0.00	0.07	0.05	0.10	0.06	.23***	--				
12. GAD-M	0.05	-0.03	-0.01	0.03	0.02	-0.04	0.00	0.08	0.04	.32***	0.03	--			
13. GAD-F	-0.06	0.02	0.01	-0.04	-0.04	-0.02	0.05	0.09	0.05	0.05	.34***	.18**	--		
14. PHQ-M	-0.01	-0.04	0.01	0.07	0.06	0.01	0.07	0.07	0.02	.36***	0.03	.70***	.17**	--	
15. PHQ-F	-0.01	0.01	-0.03	-0.05	-0.08	-0.07	0.01	0.04	0.02	.14*	.30***	0.11	.61***	.15*	--
<i>M</i>	1.74	1.59	1.48	12.43	11.31	10.89	4.00	3.61	3.57	1.76	2.13	5.34	5.78	4.06	3.48
<i>SD</i>	0.64	0.64	0.64	4.45	4.52	4.67	3.61	3.19	3.48	0.78	1.01	4.87	4.59	4.35	3.86
<i>n</i>	268	246	245	269	246	246	269	246	246	267	236	267	236	267	235

\*  $p < .05$ ;\*\*  $p < .01$ ;\*\*\*  $p < .001$ .

<sup>a</sup> DSA = Youth Discrimination Stress Appraisals; Dep = Youth Depression; Anx = Youth Anxiety; EDS-M = Everyday Discrimination Scale-Mothers; EDS-F = Everyday Discrimination Scale-Fathers; GAD-M = Generalized Anxiety Disorder – Mothers; GAD-F = Generalized Anxiety Disorder – Fathers; PHQ-M = Patient Health Questionnaire-9 (Depression) – Mothers; PHQ-F = Patient Health Questionnaire-9 (Depression) – Fathers. Numbers after youth measures refer to T1, T2, or T3 for youths. All parent measures above were administered at T1; *M* = mean; *SD* = standard deviation. *N* = 269 adolescents at T1; *n* = 246 adolescents at T2 and T3. *n* = 267 mothers and *n* = 236 fathers at T1.

**Table 3**

## Results From Longitudinal and Cross-Sectional Multilevel Moderation Analyses

Longitudinal Multilevel Moderation Analyses (Youth data from Times 1, 2, and 3 were used; parent data from Time 1 were used)				
Youths' mental health	$\gamma_{10}$	$\gamma_{11}$ (mothers)	$\gamma_{12}$ (fathers)	
Anxiety	4.81 (.137)	−0.33 (.469)	0.23 (.459)	
Depression	−1.93 (.479)	−0.37 (.340)	<b>0.66 (.022)</b>	
Cross-Sectional Multilevel Moderation Analyses (Time 1 data were used)				
Parents' mental health	$\gamma_{20}^F$	$\gamma_{20}^M$	$\gamma_{21}^M$	
Anxiety	0.35 (.650)	<b>2.89 (.005)</b>	−0.57 (.281)	
Depression	0.70 (.309)	<b>2.04 (.022)</b>	−0.17 (.716)	

The values outside the parentheses are the point estimates, and the values inside the parentheses are  $p$  values;  $ps < .05$  are given in bold. The missing data handling method was full information likelihood estimation.

$\gamma_{10}$  measures the average within-adolescent relation between youths' discrimination—mental health after controlling for the covariates, and  $\gamma_{11}$  and  $\gamma_{12}$  measure the moderating effects of mothers' and father's discrimination experiences on the within-adolescent link between youths' discrimination and youths' mental health respectively (cross-level moderation effects) in the longitudinal multilevel moderation analyses.  $\gamma_{20}^F$  measures the strength of fathers' discrimination—mental health link after controlling for the covariates,  $\gamma_{21}^F$  measures whether youths' discrimination experiences at Time 1 moderate fathers' discrimination—mental health link at Time 1,  $\gamma_{20}^M$  measures the strength of mothers' discrimination—mental health link after controlling for the covariates, and  $\gamma_{21}^M$  measures whether youths' discrimination experiences at Time 1 moderate mothers' discrimination—mental health link at Time 1.